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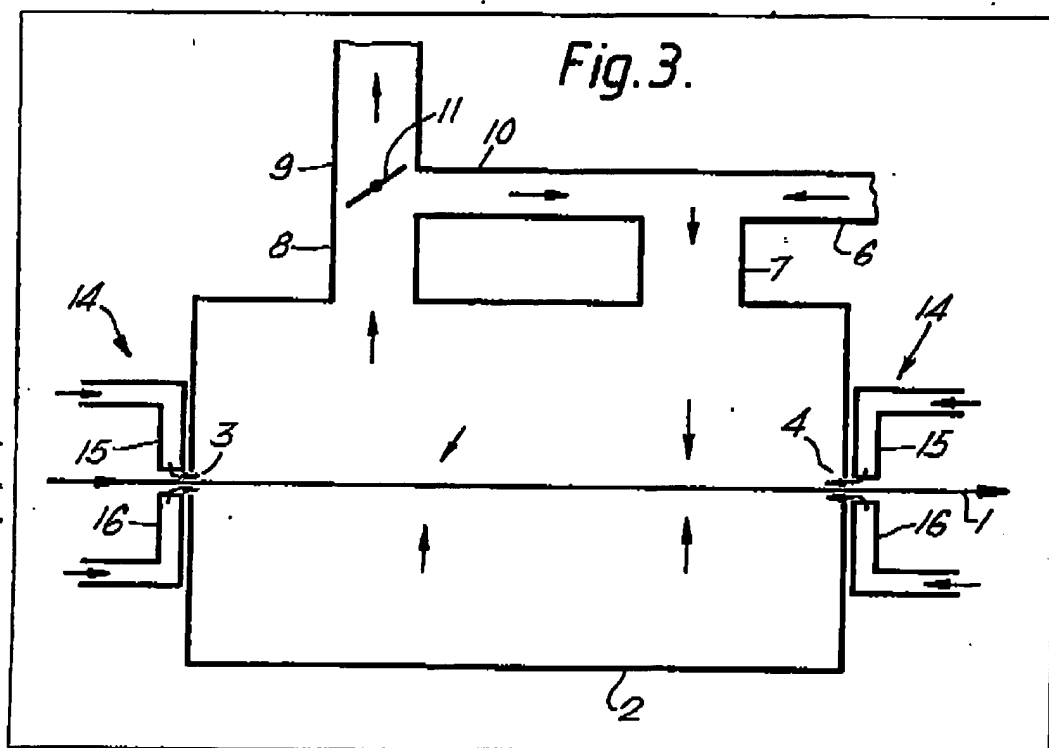
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(54) Web drying apparatus

(57) A secondary supply of hot air prevents the formation of condensate on internal walls near the entry and exit slots for the web. Hot air enters the chamber (2) from a primary supply (6), and is extracted through an exhaust duct (9) or recirculated (10).

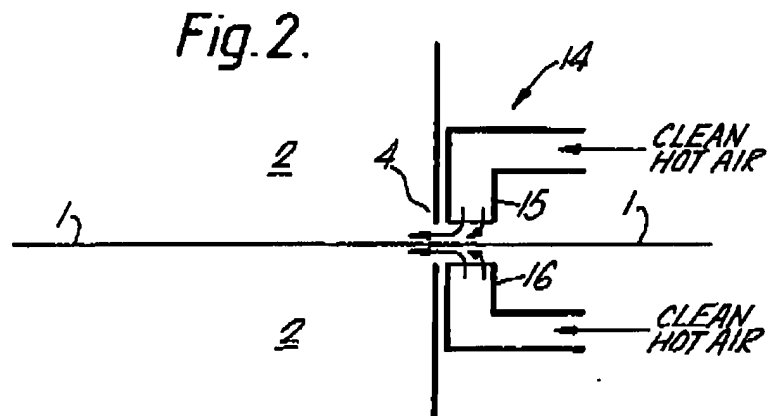
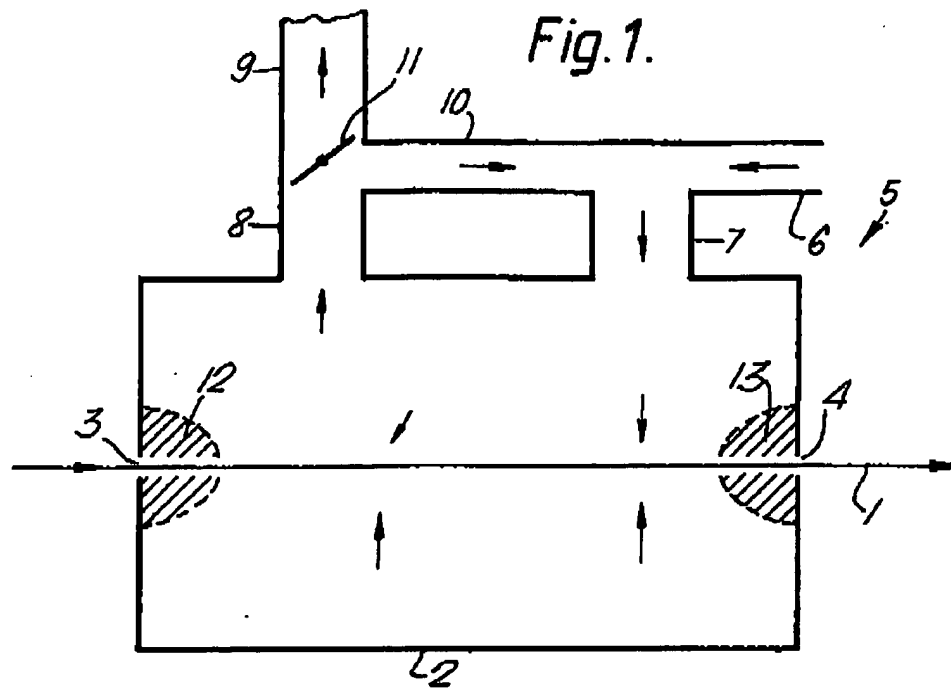
Secondary air supplies (14), comprising air nozzles above (15) and below (16) the web, direct hot air at high pressure into the chamber to establish a hot air curtain inside the chamber, close to the slots. This prevents condensation caused by the entry of cold air through the slots from outside the chamber.



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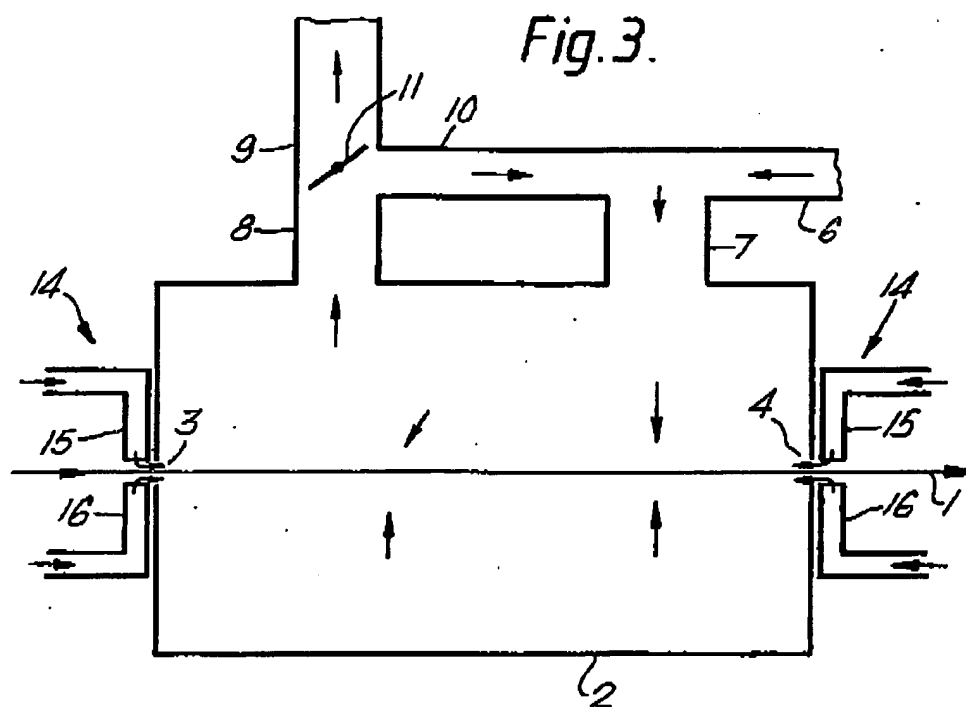
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SPECIFICATION

Web drying apparatus

This invention relates to apparatus for drying a web with hot air as it passes through a chamber. It is particularly useful for drying ink on a paper web applied during an offset printing process.

Apparatus for floating webs in a hot air chamber is well known in the art of printing. A schematic representation of such apparatus is shown in Figure 1 of the accompanying drawings. A web 1 enters a chamber 2 through a first web slot 3 on one side of the chamber, passes through the chamber, and leaves the chamber through a second web slot 4, on the opposite side of the chamber. Clean air enters the apparatus 5 through a first duct 6, is heated by a burner 7, and enters the chamber 2 at a high velocity. The hot air dries the web by absorbing the volatile solvents from it. These solvents are now in gaseous form and are extracted from the vicinity of the web 1. Solvent-laden air is extracted from the chamber 2 through a second duct 8; some of this air is exhausted through an exhaust duct 9, and some is recirculated via a recirculation duct 10 to the burner 7, the proportion recirculated being determined by a valve 11. The recirculated air conserves heat, but increases the solvent concentration in the chamber 2.

In order to prevent the noxious, solvent-laden air exhausting into the atmosphere through the two web slots 3 and 4, the pressure within the chamber 2 is maintained at a lower level than exists outside, resulting in a small volume of colder air flowing into the chamber from the outside, through the web slots. The effect of air at the ambient external temperature mixing with the hot, solvent-laden air is to reduce the air temperature in the vicinity of the web slots 3 and 4, in shaded regions 12 and 13 of the chamber, so that solvent-laden air in these regions reaches a temperature below its dew point, causing precipitation of the solvent residues. This undesirable effect is known as sapping.

The condensate, or sapp, adheres to the internal walls of the chamber and builds up in volume to such an extent that solidified condensate falls on to the web 1. Sapping is also the cause of blockages in some of the air ducts.

Web drying apparatus according to the invention comprises: a hot air chamber with a first and a second web slot at opposite ends, the first web slot for admitting a web and the second web slot for allowing the web to be drawn out of the chamber after it has been dried by hot air in the chamber; a primary hot air supply to the chamber; an exhaust duct for extracting solvent-laden air; and means for guiding a secondary flow of hot air to the vicinity of at least one of the web slots to establish a hot air curtain over the interior walls of the chamber near to the web slot and to maintain the said wall near the web slot at a temperature above the sapp dew point.

In this way, web drying apparatus according to the invention eliminates sapping and its

undesirable effects.

In a preferred form of the invention, the means for guiding a secondary flow of hot air comprises a first and secondary air supply located outside the chamber and next to the first and second web slots respectively, so that hot air at a temperature above the sapp dew point temperature is provided at such a rate and a pressure that it is directed into the chamber through the web slots, thus establishing a hot air curtain over the interior walls of the chamber near to the web slots.

Preferably, each secondary air supply consists of two nozzles, disposed on either side of the relevant web slot and connected to a source of hot air at a pressure greater than the air pressure within the chamber, so arranged that when a web is being dried in the apparatus and part of the web extends through each web slot, the nozzles direct hot air through the web slot from each side of the web.

A preferred embodiment of the invention will now be described with reference to the accompanying drawings, of which:

Figure 1 is a schematic representation of a conventional web drying apparatus;

Figure 2 shows the additional features of a web drying apparatus according to the invention which prevent sapping, and

Figure 3 shows a complete web drying apparatus embodying the invention.

A preferred apparatus embodying the invention is of the type shown in Figure 1 and comprises a hot air chamber 2 with first and second web slots 3 and 4 at opposite ends to allow the passage of a paper web 1 through the apparatus. However in the apparatus embodying the present invention, next to the second web slot 4 and outside the chamber, lies a secondary hot air supply 14, as shown in Figure 2. A similar secondary hot air supply lies in a corresponding position next to the first web slot 3. The complete apparatus is shown in Figure 3. Each secondary hot air supply 14 comprises first and second nozzles 15 and 16, on either side of the paper web 1, for directing hot air from a source (not shown) on to the web and into the chamber 2. This hot air is at a sufficiently high pressure, and is supplied at a sufficient rate to enter the chamber 2. It is at a temperature above the sapp dew point, so that it forms a hot air curtain around the interior walls of the chamber in the vicinity of the web slots and thus prevents sapping.

CLAIMS

1. Web drying apparatus comprising: a hot air chamber with a first and a second web slot at opposite ends, the first web slot for admitting a web and the second web slot for allowing the web to be drawn out of the chamber after it has been dried by hot air in the chamber; a primary hot air supply to the chamber; an exhaust duct for extracting solvent-laden air; and means for guiding a secondary flow of hot air to the vicinity of at least one of the web slots to establish a hot air curtain over the interior wall of the chamber

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near to the web slot and to maintain the said wall near the web slot at a temperature above the sagg dew point.

2. Web drying apparatus according to claim 1, wherein the means for guiding a secondary flow of the hot air comprises a first and a secondary air supply located outside the chamber and next to the first and second web slots respectively, so that hot air at a temperature above the sagg dew point temperature is provided at such a rate and a pressure that it is directed into the chamber through the web slots, thus establishing a hot air curtain over the interior walls of the chamber near to the web slots.
3. Web drying apparatus according to claim 1 or 2, wherein the or each secondary air supply

consists of two nozzles, disposed on opposite sides of the relevant web slot and connected to a source of hot air at a pressure greater than the air pressure within the chamber, so arranged that when a web is dried in the apparatus and part of the web extends through each web slot, the nozzles direct hot air through the web slot from each side of the web.

4. Web drying apparatus according to claim 1, 2 or 3, wherein some at least of the solvent-laden air extracted from the chamber is recirculated to the chamber to conserve heat.
5. Web drying apparatus substantially as herein described with reference to the accompanying drawings.

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